

Attorney Docket No. P12541-US1
Customer Number 27045

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims

1. (Currently Amended) A method of controlling access to a shared communication medium, the method comprising:

dividing a revolving priority queue (RPQ) into at least a low priority tier having a plurality of request queues and a high priority tier having a plurality of request queues; and

directing a newly received request for access to the shared communication medium into an initial queue in the high priority tier if throughput for an end user associated with the newly received request for access fails to meet a guaranteed throughput;

directing the newly received request for access to the shared communication medium into an initial queue in the low priority tier if throughput for an end user associated with the request for access meets or exceeds the guaranteed throughput;

reading queued requests for access from the RPQ, wherein the queued requests are read from the high priority tier before the queued requests are read from the low priority tier of queues, said reading step comprising:

reading the queued requests from secondary queues of the high priority tier;

then reading the queued requests from secondary queues of the low priority tier;

then reading the queued requests from initial queues of the high priority tier; and

then reading the queued requests from initial queues of the low priority tier; and

allocating bandwidth based on the order in which the queued requests are read from the RPQ.

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2-4. (Canceled)

5. (Currently Amended) The method according to claim 1, wherein the step of directing [[a]] the newly received request for access into [[an]] the initial queue in the high priority tier if throughput for an end-user associated with the request fails to meet a guaranteed throughput, comprises includes:

~~receiving a~~ associating the newly received request for access ~~to the shared communication medium associated with a connection having a guaranteed throughput;~~

determining [[if]] whether the connection associated with the newly received request for access has met its guaranteed throughput;

placing the newly received request for access in the high priority tier of the RPQ if the connection associated with the newly received request for access has not met its guaranteed throughput; and

placing the newly received request for access in the low priority tier of the RPQ if the connection associated with the newly received request for access has met its guaranteed throughput.

6. (Currently Amended) The method according to ~~claim 2~~ claim 1, further comprising promoting queued requests in the low priority tier to [[a]] one of the request queue queues in the high priority tier if, at a promotion time, the queued requests have not been read from [[a]] one of the low priority tier request queue queues.

7. (Currently Amended) The method according to claim 6, wherein a queued request associated with a connection which meets or exceeds its guaranteed throughput may be placed in ~~a queue~~ one of the request queues in the high priority tier only by promotion from [[a]] one of the request queue queues in the low priority tier.

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8. (Currently Amended) The method according to claim 5, further comprising the step of placing newly received requests for access, which do not have an associated guaranteed throughput, into one of the request queue queues in the low priority tier.

9. (Currently Amended) The method according to ~~claim 2~~ claim 1, wherein the shared communication medium is a cable television system, and wherein the requests for access comprise requests for access to an upstream channel of the cable television system.

10. (Original) The method according to claim 9, wherein the cable television system is a Data Over Cable (DOCSIS) compatible system.

11. (Currently Amended) ~~The method according to claim 10, wherein the step of allocating bandwidth comprises:~~ A method of controlling access to a cable television system, the method comprising:

dividing a revolving priority queue (RPQ) into at least a low priority tier having a plurality of request queues and a high priority tier having a plurality of request queues;

directing a newly received request for access to an upstream channel of the cable television system into an initial queue in the high priority tier if throughput for an end user associated with the newly received request for access fails to meet a guaranteed throughput;

directing the newly received request for access to the upstream channel of the cable television system into an initial queue in the low priority tier if throughput for an end user associated with the request for access meets or exceeds the guaranteed throughput;

reading requests for access from the RPQ, wherein requests for access are read from the high priority tier before requests for access are read from the low priority tier;

generating a map allocating upstream bandwidth based on the read requests;
and

broadcasting the map to cable modems on a downstream channel.

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12. (Currently Amended) A method of allocating bandwidth for a shared communication medium, the method comprising:

dividing a revolving priority queue (RPQ) into at least a low priority tier having a plurality of queues and a high priority tier having a plurality of queues;

determining whether a throughput guarantee associated with a given connection is met;

if the throughput guarantee associated with the given connection is not met, queuing information in the high priority tier indicating bandwidth requirements for [[a]] the given connection in the high priority tier if a throughput guarantee associated with the connection is not met; and

if the throughput guarantee associated with the given connection is met, queuing information in the low priority tier indicating bandwidth requirements for the given connection; and

allocating bandwidth for each connection based on an order in which the information indicating bandwidth requirements for [[a]] each connection is read from the RPQ;

wherein the information indicating bandwidth requirements comprises packets, and the step of allocating bandwidth includes reading the packets from the RPQ and placing the read packets in an output queue in transmission order.

13-14. (Canceled)

15. (Currently Amended) A system for controlling access to a shared communication medium, comprising:

a bandwidth allocator circuit configured to received requests for bandwidth of the shared communication medium and to allocate bandwidth of the shared communication medium based on the received requests, the bandwidth allocator circuit further comprising:

a first tier of revolving priority queues configured to store requests for bandwidth;

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a second tier of revolving priority queues configured to store requests for bandwidth, said second tier being operably coupled to the first tier so that requests for bandwidth from the first tier of revolving priority queues are promoted to the second tier of revolving priority queues; and

a request evaluator circuit configured to determine whether a throughput guarantee associated with the given request is met, and to selectively direct requests to one of the given request to either the first tier of revolving priority queues or the second tier of revolving priority queues based on whether ~~[[a]]~~ the throughput guarantee associated with ~~[[a]]~~ the given request is met.

16. (Canceled)

17. (Currently Amended) The system according to claim 15, wherein the bandwidth allocator circuit is further configured to read requests for bandwidth from the second tier of revolving priority queues ~~and, to~~ allocate bandwidth based on the order in which the requests for bandwidth are read from the second tier, of revolving priority queues and then to read requests from the first tier of revolving priority queues if bandwidth remains to be allocated for a bandwidth allocation period.

18. (Currently Amended) The system according to claim 17, wherein the first and second tiers of revolving priority queues include initial queues and secondary queues, and wherein the bandwidth allocator circuit is further configured to allocate bandwidth ~~for~~ to requests for bandwidth in the secondary queues of the second tier ~~of revolving priority queues~~ and then to allocate bandwidth ~~for~~ to requests for bandwidth in secondary queues of the first tier ~~of revolving priority queues~~ until all bandwidth for an allocation period has been allocated.

19. (Currently Amended) The system according to claim 15, wherein N priority levels are associated with the requests for bandwidth and wherein the first tier of revolving priority queues ~~comprise~~ comprises 2N queues and the second tier of revolving priority queues ~~comprise~~ comprises 2N queues.

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20. (Currently Amended) The system according to claim 19, wherein the first tier of revolving priority queues comprises N initial queues and N secondary queues, and the second tier of revolving priority queues comprises N initial queues and N secondary queues, wherein the initial queues and the secondary queues in each tier are configured to promote requests from an initial queue to a corresponding secondary queue in the same tier at a promotion time, and to concatenate requests in a secondary queue with requests in a corresponding initial queue at a concatenation time.

21. (Currently Amended) The system according to claim 20, wherein [[a]] one of the secondary queue queues of the first tier ~~of revolving priority queues~~ is operably associated with [[an] one of the initial queue queues of the second tier ~~of revolving priority queues~~ such that requests in the associated secondary queue are concatenated with requests in the ~~primary~~ associated initial queue at the concatenation time.

22. (Currently Amended) The system according to claim 15, wherein the shared communication medium is a cable television system, and wherein the requests for bandwidth comprise requests for access to an upstream channel of the cable television system.

23. (Original) The system according to claim 22, wherein the cable television system is a Data Over Cable (DOCSIS) compatible system.

24. (Currently Amended) A system for controlling access to a shared communication medium, comprising:

means for dividing a revolving priority queue (RPQ) into at least a low priority tier having a plurality of request queues and a high priority tier having a plurality of request queues; and

means for directing a newly received request for access to the shared communication medium into an initial queue in the high priority tier if throughput for an

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end user associated with the newly received request for access fails to meet a guaranteed throughput;

means for directing the newly received request for access to the shared communication medium into an initial queue in the low priority tier if throughput for an end user associated with the request for access meets or exceeds the guaranteed throughput;

means for reading queued requests for access from the RPQ, wherein the queued requests are read from the high priority tier before the queued requests are read from the low priority tier of queues, said reading means being adapted to:

first read the queued requests from secondary queues of the high priority tier;

then read the queued requests from secondary queues of the low priority tier;

then read the queued requests from initial queues of the high priority tier;
and

then read the queued requests from initial queues of the low priority tier;
and

means for allocating bandwidth based on the order in which the queued requests are read from the RPQ.

25. (Currently Amended) A system for allocating bandwidth for a shared communication medium, comprising:

means for dividing a revolving priority queue (RPQ) into at least a low priority tier having a plurality of queues and a high priority tier having a plurality of queues;

means for determining whether a throughput guarantee associated with a given connection is met;

means responsive to a determination that the throughput guarantee associated with the given connection is not met, for queuing information in the high priority tier indicating bandwidth requirements for [[a]] the given connection in the high priority tier if a throughput guarantee associated with the connection is not met; and

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means responsive to a determination that the throughput guarantee associated with the given connection is met, for queuing information in the low priority tier indicating bandwidth requirements for the given connection; and

means for allocating bandwidth for each connection based on an order in which the information indicating bandwidth requirements for [[a]] each connection is read from the RPQ;

wherein the information indicating bandwidth requirements comprises packets, and the means for allocating bandwidth includes means for reading the packets from the RPQ and placing the read packets in an output queue in transmission order.

26. (Currently Amended) A computer program product for controlling access to a shared communication medium, comprising:

a computer readable program medium having computer readable program code embodied therein, the computer readable program code comprising:

computer readable program code, which divides a revolving priority queue (RPQ) into at least a low priority tier having a plurality of request queues and a high priority tier having a plurality of request queues; and

computer readable program code, which directs a newly received request for access to the shared communication medium into an initial queue in the high priority tier if throughput for an end user associated with the newly received request for access fails to meet a guaranteed throughput;

computer readable program code, which directs the newly received request for access to the shared communication medium into an initial queue in the low priority tier if throughput for an end user associated with the request for access meets or exceeds the guaranteed throughput;

computer readable program code, which reads queued requests for access from the RPQ, wherein the queued requests are read from the high priority tier before the queued requests are read from the low priority tier of queues, wherein the queued requests are read first from secondary queues of the high priority tier, then from secondary queues of the low priority tier, then from initial queues of the high priority tier, and then from initial queues of the low priority tier; and

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computer readable program code, which allocates bandwidth based on the order in which the queued requests are read from the RPQ.

27. (Currently Amended) A computer program product for allocating bandwidth for a shared communication medium, comprising:

a computer readable program medium having computer readable program code embodied therein, the computer readable program code comprising:

computer readable program code, which divides a revolving priority queue (RPQ) into at least a low priority tier having a plurality of queues and a high priority tier having a plurality of queues;

computer readable program code, which determines whether a throughput guarantee associated with a given connection is met;

computer readable program code, which queues information in the high priority tier indicating bandwidth requirements for [[a]] the given connection in the high priority tier if a if the throughput guarantee associated with the given connection is not met; and

computer readable program code, which queues information in the low priority tier indicating bandwidth requirements for the given connection if the throughput guarantee associated with the given connection is met; and

computer readable program code, which allocates bandwidth for each connection based on an order in which the information indicating bandwidth requirements for [[a]] each connection is read from the RPQ;

wherein the information indicating bandwidth requirements comprises packets, and the computer readable program code that allocates bandwidth reads the packets from the RPQ and places the read packets in an output queue in transmission order.